CLAIMS

We claim:

1. A gas turbine engine component comprising:

a metallic airfoil having a leading edge and a trailing edge and a pressure side and a suction side,

at least one laser shock peened surface on at least one side of said airfoil,

said laser shock peened surface extending radially along at least a portion of said leading edge and extending chordwise from said leading edge, and

a region having deep compressive residual stresses imparted by laser shock peening (LSP) extending into said airfoil from said laser shock peened surface.

2. A component as claimed in claim 1 further comprising:

a first laser shock peened surface located along said pressure side of said leading edge, and

a first region having deep compressive residual stresses imparted by laser shock peening (LSP) extending into said airfoil from said first laser shock peened surface,

a second laser shock peened surface located along said suction side of said leading edge, and

a second region having deep compressive residual stresses imparted by laser shock peening (LSP) extending into said airfoil from said second laser shock peened surface.

3. A component as claimed in claim 2 wherein said laser shock peened regions extending into said airfoil from said laser shock peened surfaces are formed by simultaneously laser shock peening both sides of said airfoil.

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4. A component as claimed in claim 2 further comprising:

pressure and suction side laser shock peened trailing edge surfaces extending radially at least along a portion of said trailing edge and extending chordwise from said trailing edge on said pressure and suction sides respectively of said airfoil,

a pressure side trailing edge laser shock peened region having deep compressive residual stresses imparted by laser shock peening (LSP) extending into said airfoil from said pressure side laser shock peened surface, and

a suction side trailing edge laser shock peened region having deep compressive residual stresses imparted by laser shock peening (LSP) extending into said airfoil from said suction side laser shock peened surface.

5. A component as claimed in claim 4 wherein said pressure side and suction side trailing edge laser shock peened regions extending into said airfoil from said laser shock peened surfaces are formed by simultaneously laser shock peening both sides of said trailing edge of said airfoil.

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6. A gas turbine engine compressor blade comprising:

a metallic airfoil having a leading edge and a trailing edge and a pressure side and a suction side,

at least one laser shock peened surface on at least one side of said airfoil,

said laser shock peened surface extending radially along at least a portion of said leading edge and extending chordwise from said leading edge, and

a region having deep compressive residual stresses imparted by laser shock peening (LSP) extending into said airfoil from said laser shock peened surface.

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~~7. A compressor blade as claimed in claim 6 further~~

comprising:

a first laser shock peened surface located along said pressure side of said leading edge, and

a first region having deep compressive residual stresses imparted by laser shock peening (LSP) extending into said airfoil from said first laser shock peened surface,

a second laser shock peened surface located along said suction side of said leading edge, and

a second region having deep compressive residual stresses imparted by laser shock peening (LSP) extending into said airfoil from said second laser shock peened surface.

8. A compressor blade as claimed in claim 7 wherein said laser shock peened regions extending into said airfoil from said laser shock peened surfaces are formed by simultaneously laser shock peening both sides of said airfoil.

9. A compressor blade as claimed in claim 8 wherein said compressor blade is a repaired compressor blade.

10. A compressor blade as claimed in claim 6 wherein said compressor blade is a repaired compressor blade.

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11. A gas turbine engine compressor blade comprising:

a metallic airfoil having a leading edge and a trailing edge,

at least one laser shock peened surface on at least one side of said airfoil,

said laser shock peened surface extending radially at least along a portion of said trailing edge and extending chordwise from said trailing edge, and

a region having deep compressive residual stresses imparted by laser shock peening (LSP) extending into said airfoil from said laser shock peened surface.

12. A compressor blade as claimed in claim 11 further comprising:

a first laser shock peened surface extending radially at least along a portion of said trailing edge and extending chordwise from said trailing edge on a pressure side of said airfoil,

a first region having deep compressive residual stresses imparted by laser shock peening (LSP) extending into said airfoil from said first laser shock peened surface,

a second laser shock peened surface extending radially at least along a portion of said trailing edge and extending chordwise from said trailing edge on a suction side of said airfoil, and

a second region having deep compressive residual stresses imparted by laser shock peening (LSP) extending into said airfoil from said second laser shock peened surface.

13. A compressor blade as claimed in claim 12 wherein said laser shock peened regions extending into said airfoil from said laser shock peened surfaces are formed by simultaneously laser shock peening both sides of said trailing edge of said airfoil.

14. A compressor blade as claimed in claim 13 wherein said compressor blade is a repaired compressor blade.

15. A compressor blade as claimed in claim 11 wherein said compressor blade is a repaired compressor blade.

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16. A gas turbine engine compressor blade comprising:

a metallic airfoil having pressure side, a suction side, a leading edge, and a trailing edge,

a first laser shock peened surface extending radially at least along a portion of one of said edges on a side of said airfoil extending radially along and chordwise from said one of said edges,

a second laser shock peened surface extending radially at least along a portion of the other one of said edges on a side of said airfoil extending radially along and chordwise from said other one of said edges, and

regions having deep compressive residual stresses imparted by laser shock peening (LSP) extending into said airfoil from said laser shock peened surfaces along said leading and trailing edges of said airfoil.

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17. A compressor blade as claimed in claim 16 further comprising:

a first pair of laser shock peened surfaces extending radially at least along a portion of said leading edge located along pressure and suction sides of said leading edge,

a first pair of regions having deep compressive residual stresses imparted by laser shock peening (LSP) extending into said airfoil from said first pair of laser shock peened surfaces,

a second pair of laser shock peened surfaces extending radially at least along a portion of said trailing edge located along pressure and suction sides of said trailing edge, and

a second pair of regions having deep compressive residual stresses imparted by laser shock peening (LSP)

extending into said airfoil from said second pair of laser shock peened surfaces.

18. A compressor blade as claimed in claim 17 wherein said laser shock peened regions extending into said airfoil from said laser shock peened surfaces are formed by simultaneously laser shock peening both sides of said leading edge of said airfoil and by simultaneously laser shock peening both sides of said trailing edge of said airfoil.

19. A compressor blade as claimed in claim 18 wherein said compressor blade is a repaired compressor blade.

20. A compressor blade as claimed in claim 16 wherein said compressor blade is a repaired compressor blade.